Diabetes Disparities in Washington State: Exploring Changes Over Time

Presentation to the Washington State Diabetes Leadership Team

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CDPU Disparities Analysis

For a number of chronic diseases and their risk factors, we wanted to know:

1. How big are current disparities?

2. How have disparities changed over time?

3. How many people are affected?

4. How do neighborhood sociodemographic factors affect risk of diabetes?

5. Which areas across the state have the highest risk of chronic diseases and their risk factors?

☀ We used BRFSS data to examine disparities by educational attainment, income and race/ethnicity

☀ **This presentation focuses on diabetes and its risk factor, obesity**

Measuring Diabetes Disparities according to Household Income
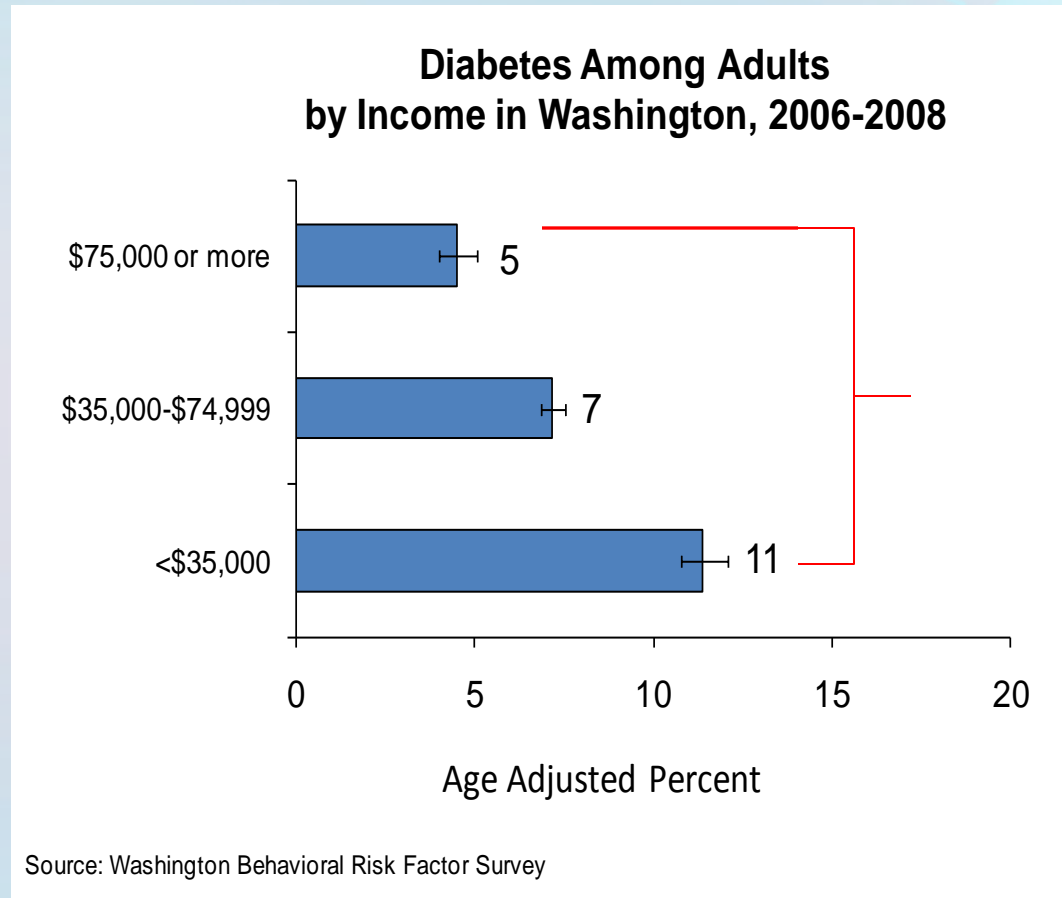
Absolute measures compare the difference in risk between the highest and lowest group:

$$11.4 - 4.5 = 6.9\%$$

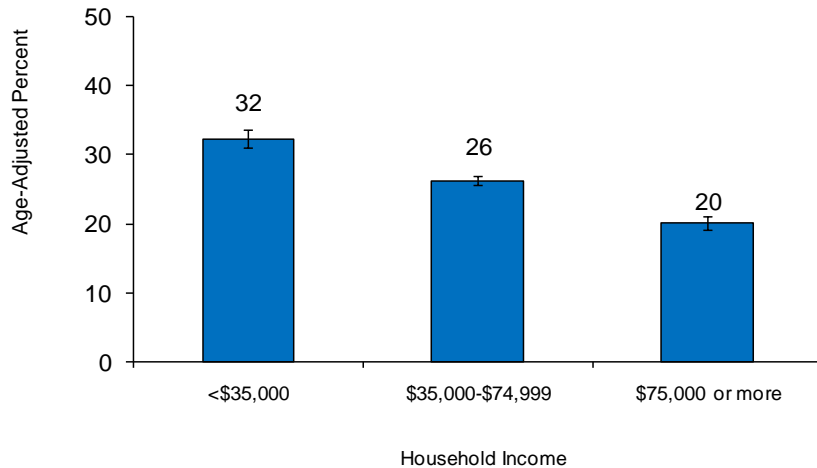**Relative measures** use a ratio or risk in the highest & lowest income groups:

$$11.4 \div 4.5 = 2.5$$

Diabetes Among Adults by Income in Washington, 2006-2008

Income	Age Adjusted Percent
$75,000 or more	5
$35,000-$74,999	7
<$35,000	11

Age Adjusted Percent

Source: Washington Behavioral Risk Factor Survey

Relative measures help you compare health conditions of different magnitudes

Disparities by Income, Washington, 2006-2008

Obesity

Age-Adjusted Percent

Household Income	Percent
<$35,000	32
$35,000-$74,999	26
$75,000 or more	20

Source: Washington Behavioral Risk Factor Survey

Diabetes

Age-Adjusted Percent

Household Income	Percent
<$35,000	11
$35,000-$74,999	7
$75,000 or more	5
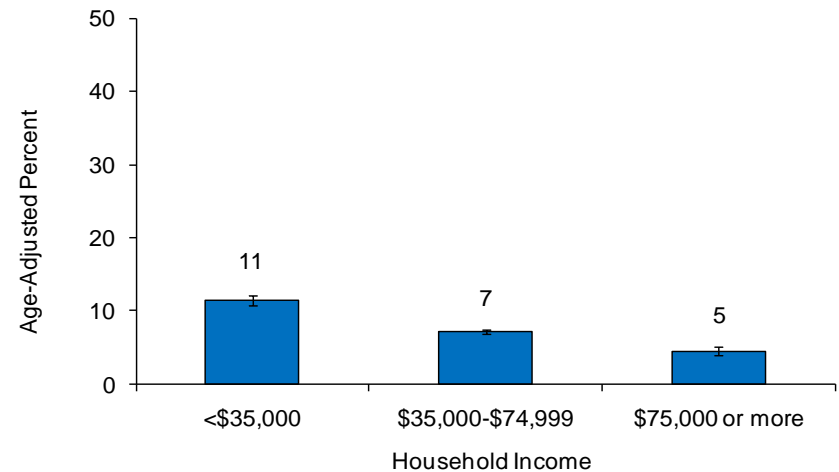
Source: Washington Behavioral Risk Factor Survey

Adults with HH incomes <$35K compared to $75 K or more		Absolute difference	Relative difference
Obesity	2006-2008	12.2%	1.6
Diabetes	2006-2008	6.9%	2.5

How many people are affected?

	Prevalence and Estimated Cases Educational Level (Adults 25+)			
	State Ave	HS or less	Some College	College grad +
Obesity	25.1%	31.9%	30.5%	19.7%
	1,236,000	488,000	440,000	260,000
Diabetes	6.9%	9.4%	8.9%	6.0%
	342,000	150,000	129,000	75,000

*based on 2006-2008 prevalences

Trends in Obesity, by Education

Obesity among Washington Adults, by Education, 1990-2008

Slope= 1.16

Slope= 0.5

Legend: HS or less — Some college — College grad

Source: Washington Behavioral Risk Factor Survey
Note: Only among adults who answered survey in English.

Excess risk of obesity by education, comparing HS education or less to college graduate

Relative risk of obesity by education, comparing HS education or less to college graduate

Trends in Diabetes by Education


Diabetes prevalence by education
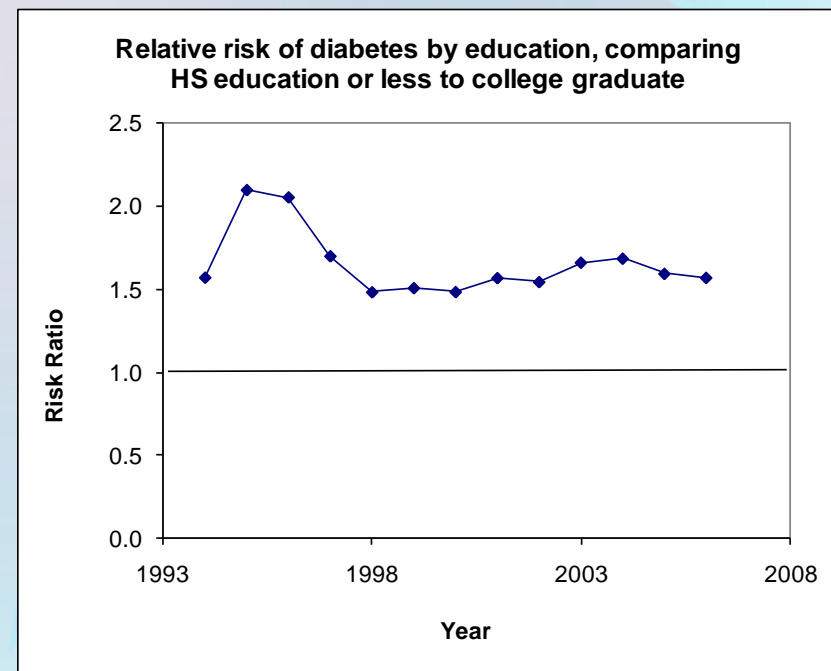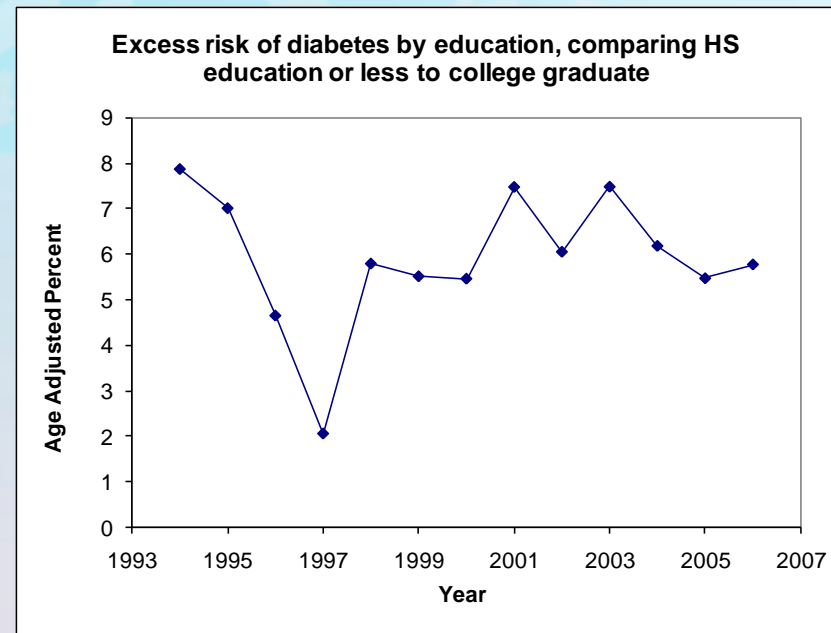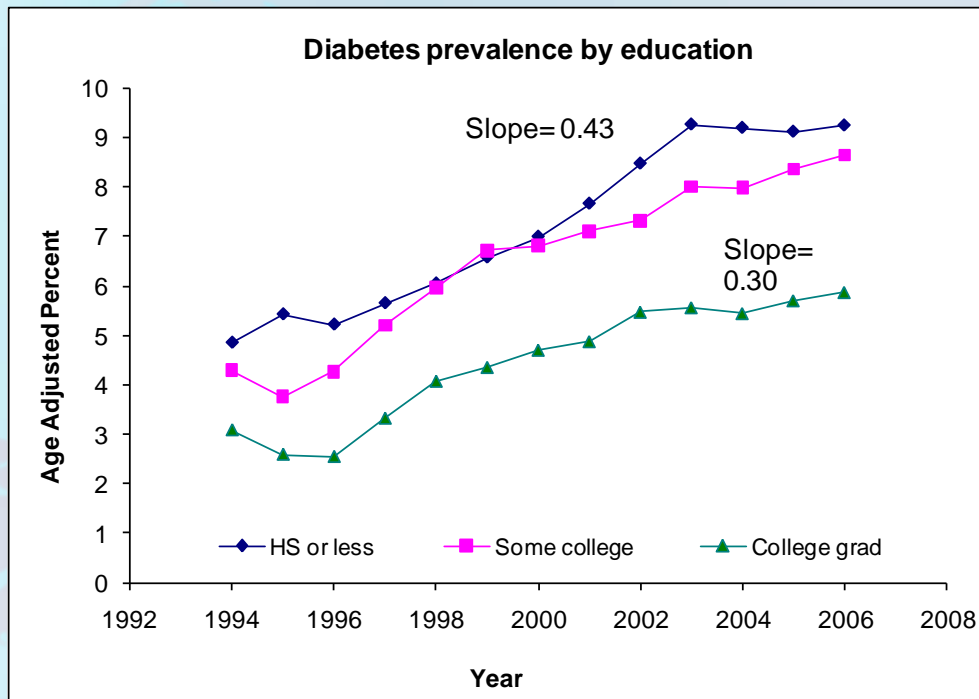
Disparities by Race/ethnicity

- Racial groups comprise unequal shares of the population

- Race = socially defined groups based on outward appearance—there's no inherent "ranking"

- Race is not merely a proxy for SES

- Disparities by "race" reflect racism, not inherent biology

Racial & Ethnic Groups in Washington, 2008

NHOPI, 0.1%

AI/AN, 1.4%

Black, 3.3%

Hispanic, 6.8%

Asian, 6.4%

White, 82%
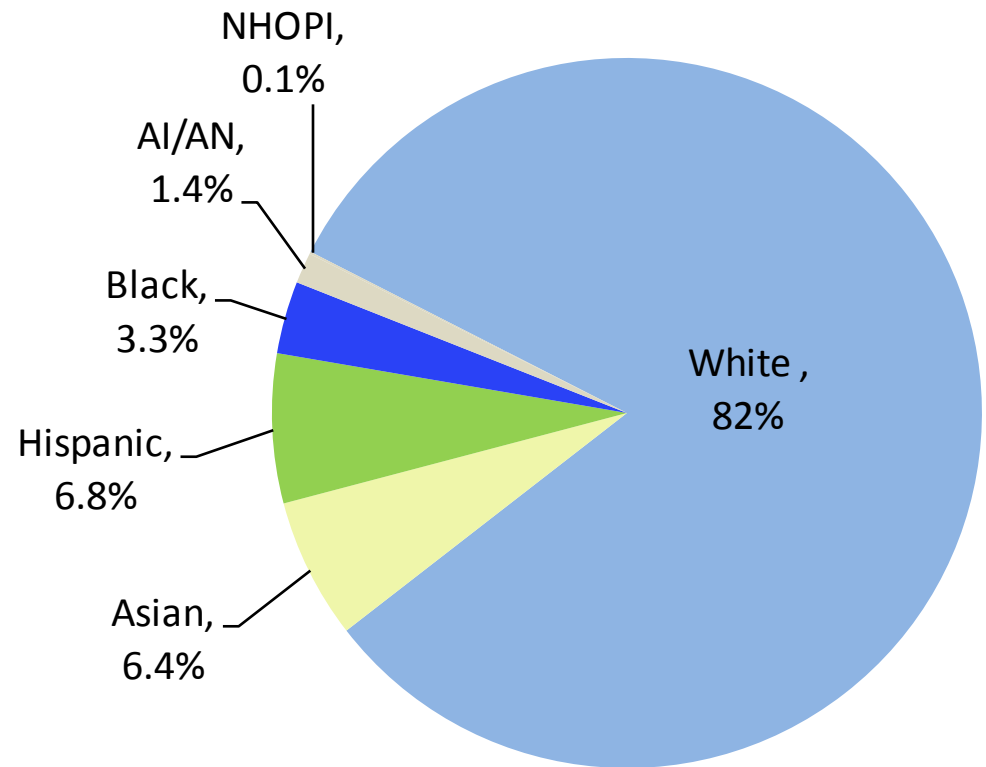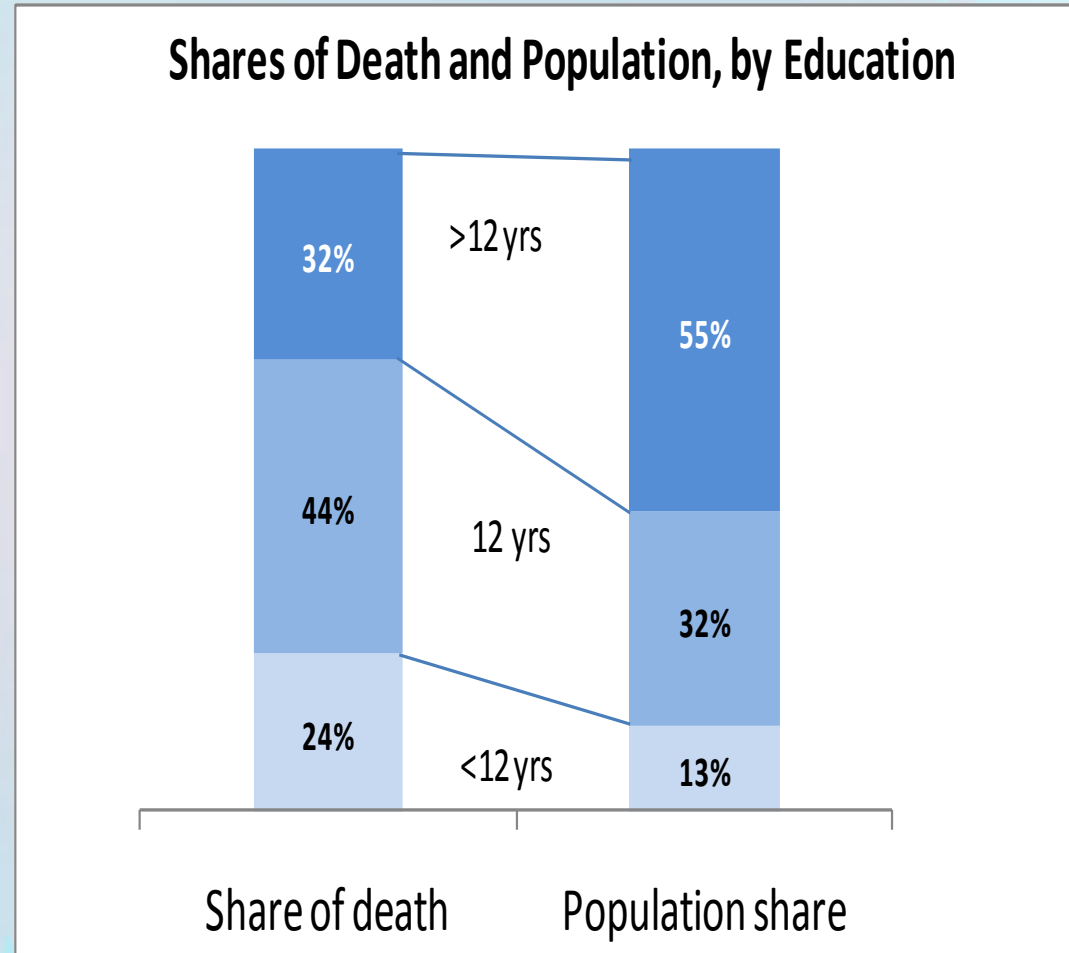
Diabetes prevalence by race / ethnicity
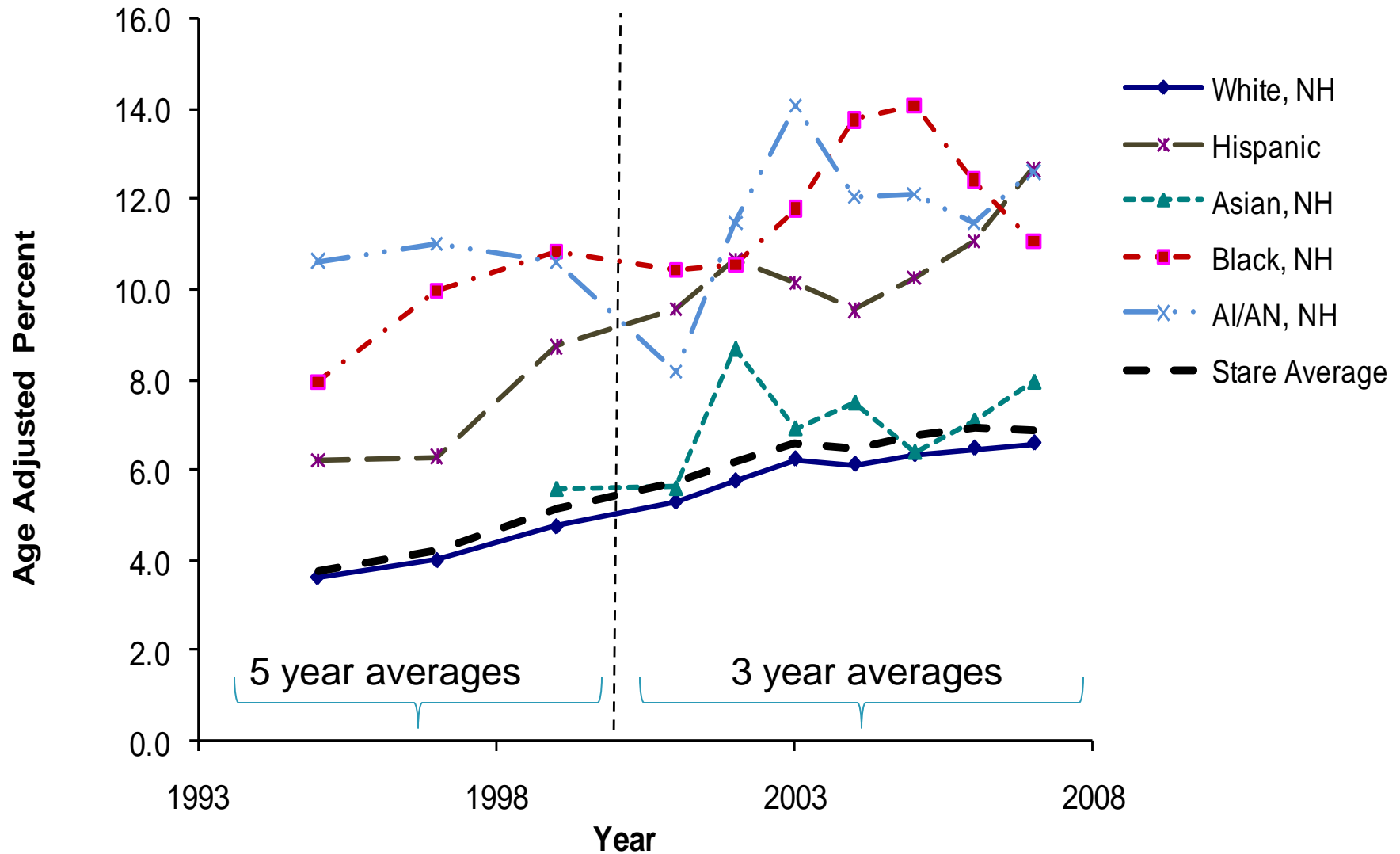
What are we looking for?

1. What do we mean by fair?

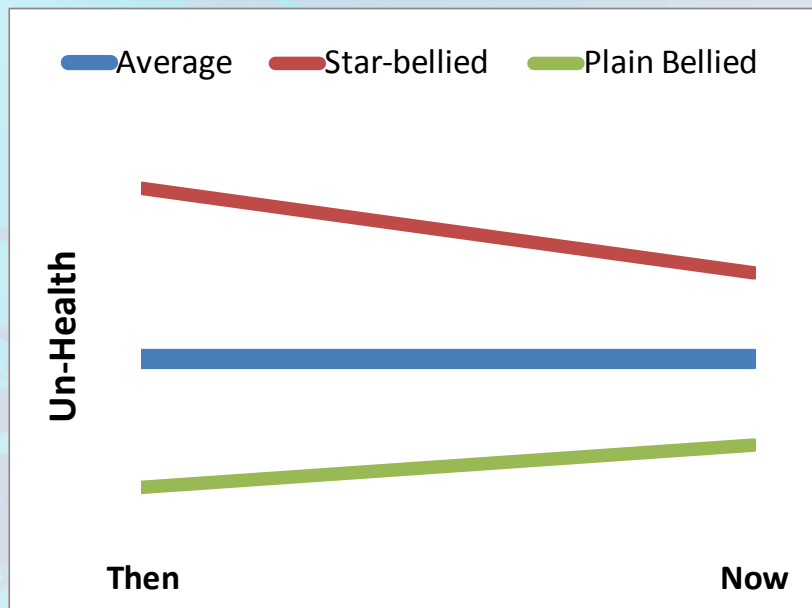   - Fair = burden of poor health is shared equally among groups, proportional to population size.

2. What improvements do we hope to detect?

   - By what means do we hope to decrease disparity?

Shares of Death and Population, by Education

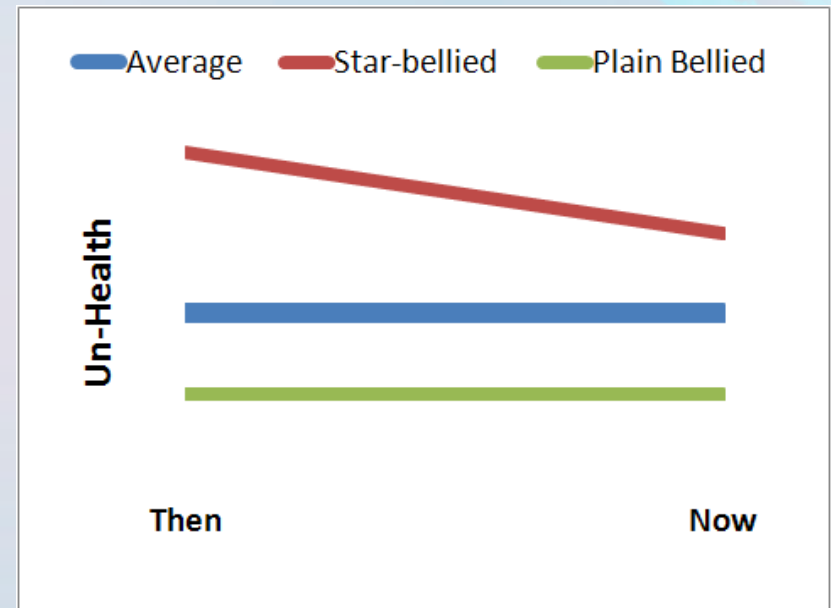|	Share of death	Population share
>12 yrs	32%	55%
12 yrs	44%	32%
<12 yrs	24%	13%

Concepts of Fairness

Health is a finite resource; share the burden equally

Disparity is reduced partly because the healthy group gives up some of their good health

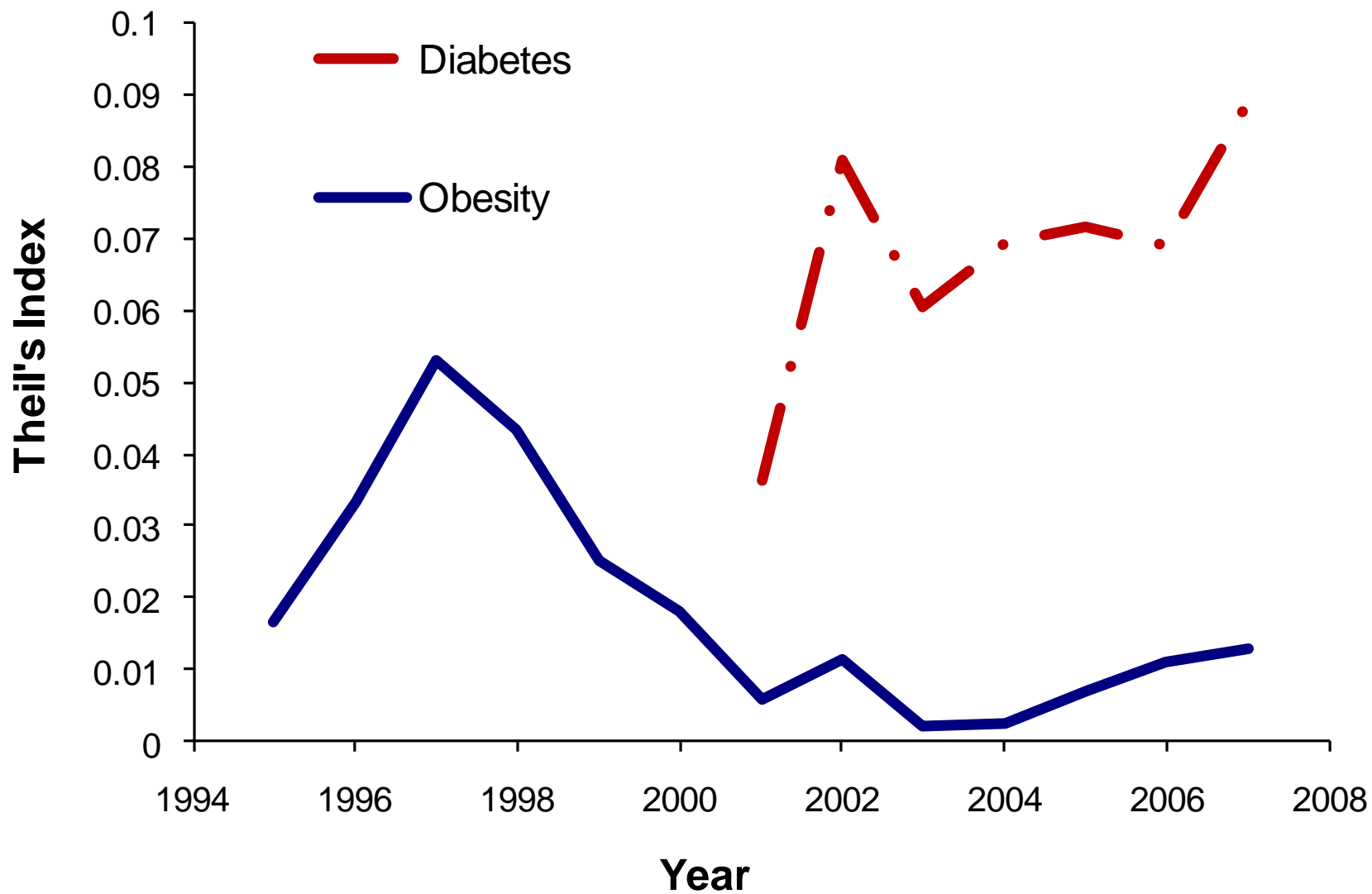No one should be left behind. All have a right to the best health possible.

Disparity reduced because sick people become healthier.

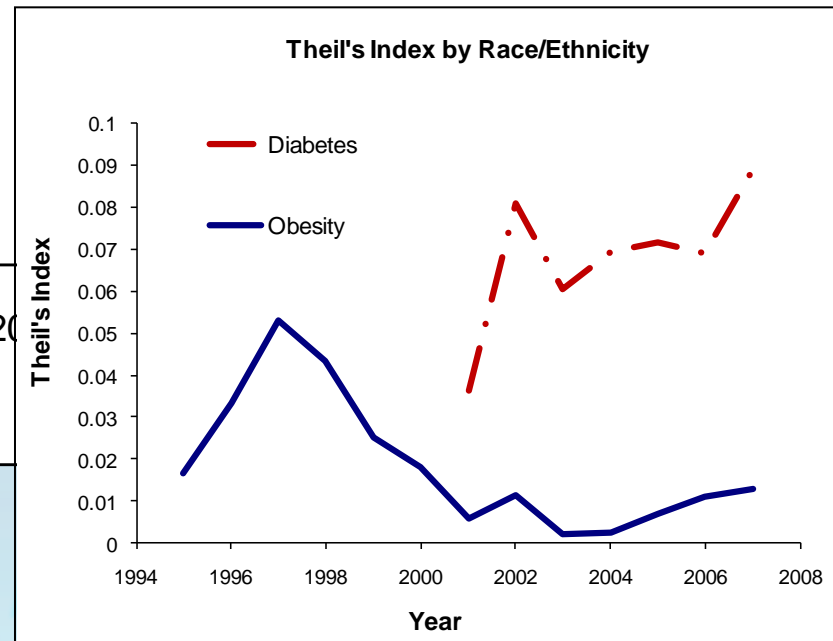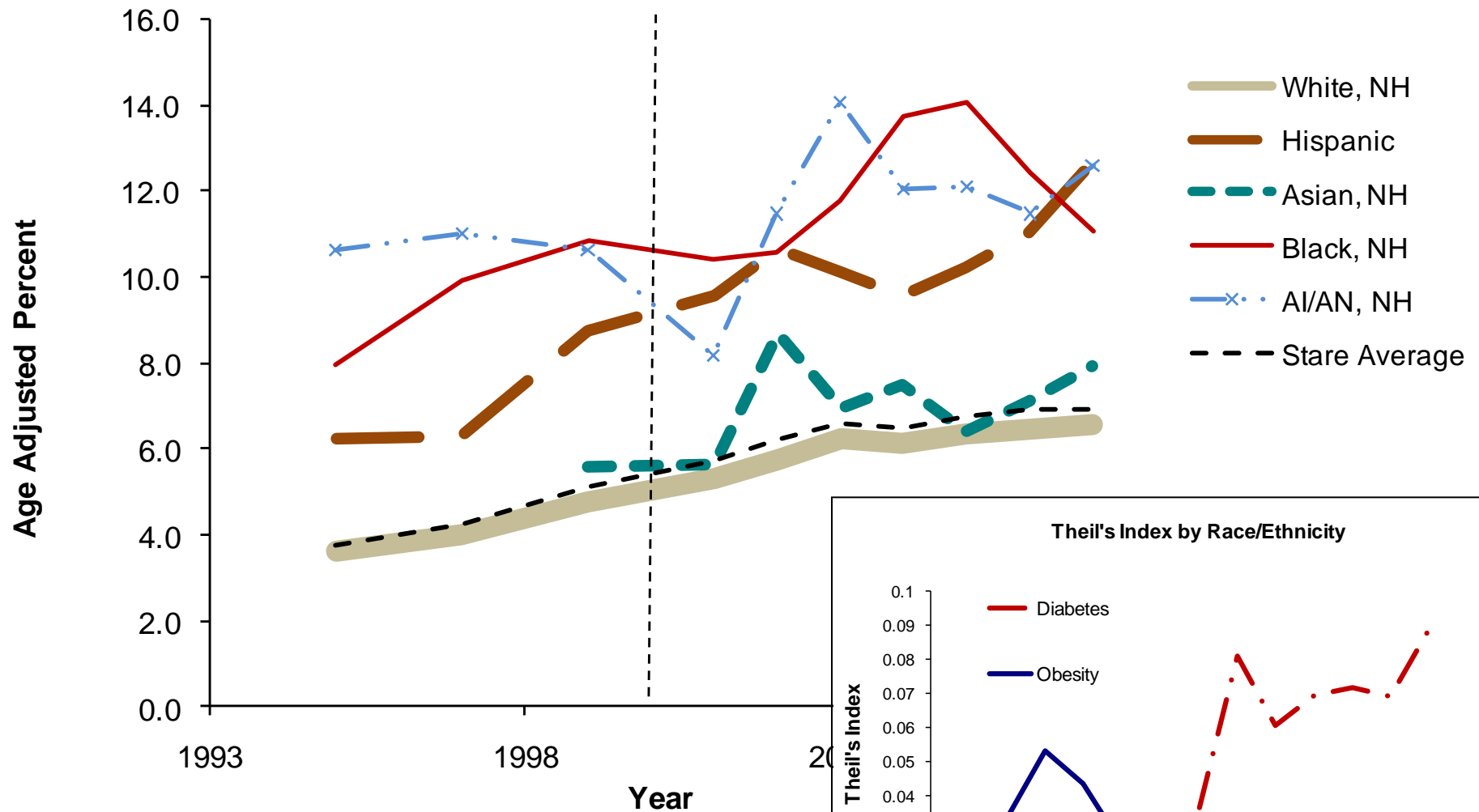# Our summary measure of racial/ethnic disparities matches our values

Theil's Index is an overall summary of the degree to which various groups are better or worse off than the **average**

- Expresses the value that no one should be left behind. Everyone has a right to the best health possible.

- Measures whether each group bears its fair share.

- Gives extra weight to groups with worse health, less weight to groups with better health
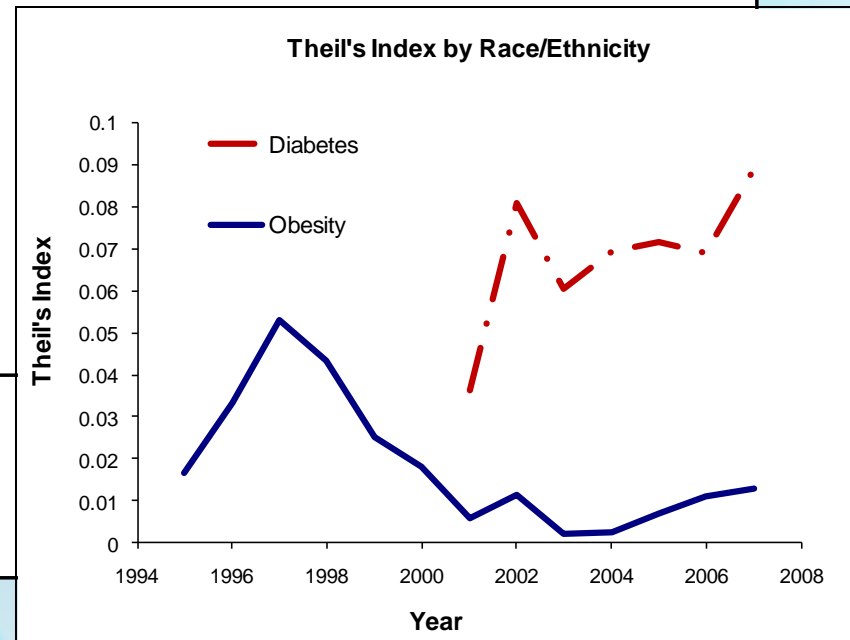
Theil's Index by Race/Ethnicity

Diabetes prevalence by race / ethnicity

Legend:
- White, NH
- Hispanic
- Asian, NH
- Black, NH
- AI/AN, NH
- Stare Average

Y-axis: Age Adjusted Percent (0.0 – 16.0)
X-axis: Year (1993 – 2008)

Inset chart: **Theil's Index by Race/Ethnicity**
- Diabetes
- Obesity

Y-axis: Theil's Index (0 – 0.1)
X-axis: Year (1994 – 2008)

Obesity prevalence by race / ethnicity
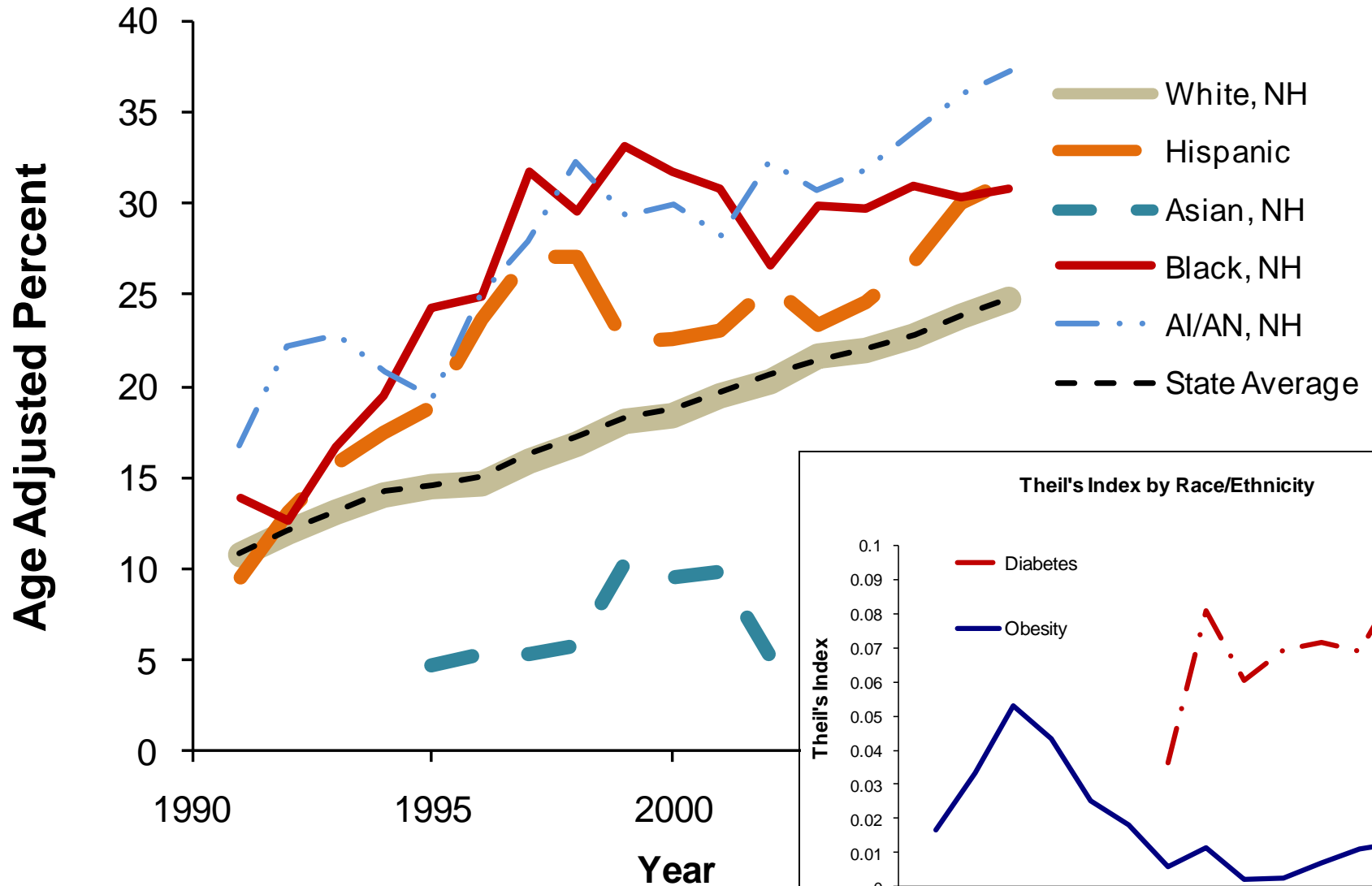
Impact of Individual & Area-Based Factors

How do neighborhood socio economic factors impact the risk of diabetes predicted by, if we control for individual factors ?

Individual Factors (BRFSS)

➢ *Age*

➢ *Income*

➢ *Education*

➢ *Race / Ethnicity*

Area Based Factors (Census)

➢ *Income*
- Median household income

➢ *Education*
- Percent with college degree

➢ *Wealth*
- Median home value

Diabetes Models
(Neighborhood factors at ZIP-Code Level)

- Model includes individual level socio-demographic factors, plus the following neighborhood characteristics:

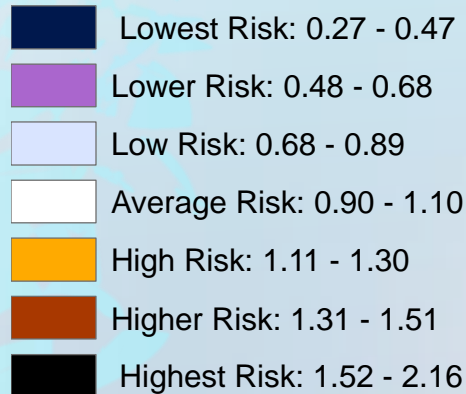| Diabetes	Coefficient (b)	P
% College Education	-0.00552	0.011
Median Home Value	-1.40E-06	0.001
% Receiving Public Assistance	0.02942	0.000
Intercept	-2.701	0.000

Odds Ratios by ZIP Code:

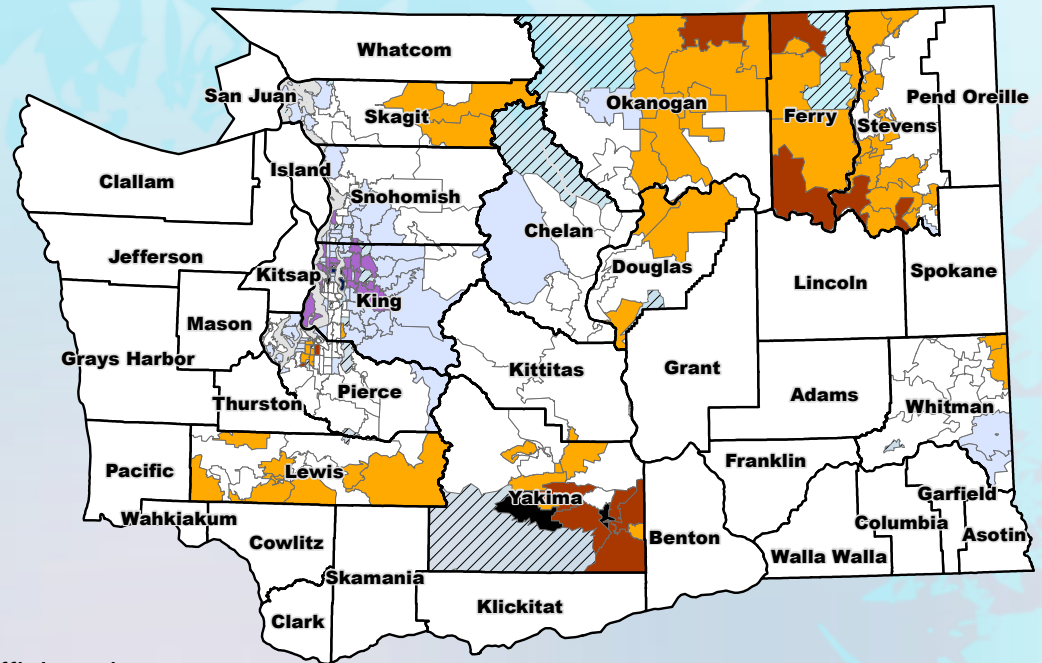Min = 0.28   Avg = 1.01
Max = 2.16   SD = 0.22

- Note: For the diabetes model, individual age is treated as a continuous covariate.

Socioeconomic Risk
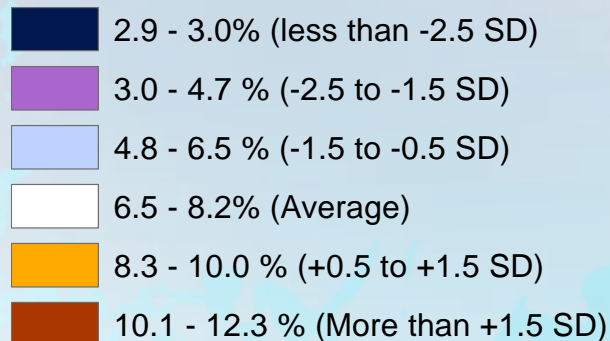
# of Diabetes by ZCTA

Diabetes Risk Odds Ratio

- Lowest Risk: 0.27 - 0.47
- Lower Risk: 0.48 - 0.68
- Low Risk: 0.68 - 0.89
- Average Risk: 0.90 - 1.10
- High Risk: 1.11 - 1.30
- Higher Risk: 1.31 - 1.51
- Highest Risk: 1.52 - 2.16

Insufficient data

Diabetes Prevalence

By County

Diabetes Prevalence

- 2.9 - 3.0% (less than -2.5 SD)
- 3.0 - 4.7 % (-2.5 to -1.5 SD)
- 4.8 - 6.5 % (-1.5 to -0.5 SD)
- 6.5 - 8.2% (Average)
- 8.3 - 10.0 % (+0.5 to +1.5 SD)
- 10.1 - 12.3 % (More than +1.5 SD)

Summary Disparities for Obesity & Diabetes

1. Disparities in the excess risk of **obesity** by grew by 6.3 percentage points between 1990 – 2008

2. For **diabetes,** both relative & absolute disparity by education were fairly constant throughout this period.

3. However, the relative disparity *by household income* is quite high for diabetes. (2.5 for diabetes, 1.6 for obesity).

4. If adults with HS or less *and* some college had the same prevalence as college grads….

    • About 342,000 fewer adults would be obese, and

    • About 96,000 fewer adults would have diabetes

5. For race/ethnicity, the relative disproportion in disparities was greatest for diabetes, and it's increasing. This is mainly due to growth of diabetes among Hispanics.

6. There are pockets of high risk of diabetes, even among "low prevalence" counties.